

Our minds are like our stomachs; they are whetted by the change of their food,
and variety supplies both with fresh appetites.
Quintilian, Roman rhetorician

HERBAL MEDICINE

High-Test Mothers' Milk

A lack of regulation means that herbal remedies can be ineffective or, conversely, far more potent than users may suspect. Researchers in Taiwan have found a new reason for consumers to be wary of certain herbal remedies: some herbs used in traditional Chinese medicine contain lead, which mothers can pass to their infants through breast milk. The study, published in the 1 February 2006 issue of *Science of the Total Environment*, adds to the growing evidence that infants can be exposed to potentially dangerous lead levels *in utero* and through breast milk.

Bans on leaded paint and gasoline have caused lead exposure during childhood to plummet. Now scientists are focusing more attention on perinatal exposure to lead via maternal circulating blood levels and breast milk. The neurotoxicant is associated with behavioral problems and diminished intelligence. Although lead has declined in the environment in a number of countries, it may still persist in soil, dust, and water in many parts of the world. Maternal bone lead accumulated during earlier exposure is released during pregnancy and lactation as the body redistributes its calcium stores.

Principal investigator Bor-Cheng Han and colleagues originally recruited 72 pregnant women, but only 16 completed the study. The women were interviewed during pregnancy and lactation to collect information on residential and occupational lead exposures, socio-demographic characteristics, and consumption of nutritional supplements, traditional Chinese herbs, alcohol, and tobacco. The women provided breast milk samples weekly from 1 to 60 days postpartum. Nine of the women took traditional herbs, while seven did not.

The researchers purchased samples of herbs that the mothers reported taking regularly—*Angelica sinensis radix*, *Lycii fructus*, *Zizyphi fructus*, and a preparation known as

Shy-Wuh-Tang. Then they tested the samples for lead content. All the samples contained lead; Shy-Wuh-Tang, used to treat menstrual and circulatory problems, had the highest levels, at 322.31 micrograms per kilogram ($\mu\text{g}/\text{kg}$).

The nine herb users had a mean lead concentration of 9.94 μg per liter (L) in colostrum, the form of milk produced just after delivery. Lead levels in their breast



Bad medicine? Testing revealed elevated lead in the breast milk of mothers who took four traditional Chinese herbal remedies.

milk dropped with most weekly samplings, to a mean concentration at the final sampling of 2.34 $\mu\text{g}/\text{L}$. Lead levels also declined in the seven mothers not using herbs, from 8.11 $\mu\text{g}/\text{L}$ in colostrum (likely reflecting occupational or pollution exposures) to 2.36 $\mu\text{g}/\text{L}$ in mature milk.

The finding that Chinese herbs were contaminated with lead comes as no surprise to research scientist Richard Ko of the California Department of Health Services. In the 17 September 1998 issue of the *New England Journal of Medicine*, Ko reported high lead levels in 24 of 260 Chinese patent medicines sold in California.

Tainted products slip easily into the hands of consumers because the FDA does not have enough resources to inspect all imported herbs, nor does it regulate herbs, which it considers dietary supplements rather than drugs. The Taiwanese researchers speculate that the herbs their subjects took were grown in contaminated soil.

In spite of the risks, the worldwide market for herbal treatments is estimated to be more than \$60 billion and growing fast, according to the UN Conference on Trade and Development. Some 30–50% of all medicines consumed in China are traditional herbs.

It is unclear how much risk the lead-contaminated herbs posed to the babies in the Taiwan study. Jenny Pronczuk de Garbino, a physician with the WHO Department of Public Health and the Environment, says that “only if the doses were extremely high would they outweigh the benefits of breastfeeding,” but that “prevention of exposure is paramount.” The FAO/WHO Joint Expert Committee on Food Additives and Contaminants, an independent scientific expert body regularly convened by the FAO and the WHO, last assessed the risk of lead exposure to human health in 1999, and established a provisional tolerable weekly intake of 25 $\mu\text{g}/\text{kg}$ body weight as a value that would not lead to any appreciable health risk. The WHO maintains in its 2003 document *Global Strategy for Infant and Young Child Feeding* that “[b]reastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants.”

Han admits his study of just 16 mothers is too small to draw conclusions from. But it adds to the growing information about how mothers' exposure may influence their infants' lead levels. The Lead and Pregnancy Work Group organized by the CDC is reviewing such studies in an effort to develop national guidelines on assessing and managing risk of lead exposure during pregnancy and lactation.

“We need a better understanding of neonatal exposure from breastfeeding,” says Adrienne Ettinger, a Harvard School of Public Health researcher and member of the CDC work group. “We don't have all the scientific data yet.” —**Cynthia Washam**

OCCUPATIONAL HEALTH

Will Work for Air

Indoor air specialists Olli Seppänen of the Helsinki University of Technology and William Fisk and Q.H. Lei of the Lawrence Berkeley National Laboratory are not the first to establish a link between work performance and ventilation—for several decades, researchers have seen an association between an inadequate supply of outdoor air and discomfort and illness among building occupants. But Seppänen and colleagues, in a meta-analysis published in the February 2006 issue of *Indoor Air*, are

centers, one was conducted in school classrooms, and three were conducted in a controlled simulated office setting. Each study compared performance at a minimum of two different ventilation rates.

From each study, Seppänen and colleagues calculated a “performance change” parameter by subtracting performance at the lower ventilation rate (expressed in liters of air per second [L/s]) from performance at the higher ventilation rate and dividing the difference by performance at the lower ventilation rate. (The performance figures were expressed in terms of speed of work, and the change in speed was expressed as a percentage.) The results



No air, no work. Reducing ventilation to save money ends up costing more in lost productivity.

the first to present a model showing the quantitative relationship between these two variables. Their findings are simple: if you want your workers to perform, you have to let them breathe fresh air.

Ventilation rates vary considerably within and among commercial buildings due to such factors as equipment design and operation. Experts say these rates are often below levels recommended by groups such as the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). However, says Charlene Bayer, a principal research scientist at Georgia Tech Research Institute, the results seen by Seppänen and others suggest that even the ASHRAE standard is probably not high enough. Further, with the recent spike in oil and natural gas prices, building managers may be keeping ventilation rates intentionally low to save on energy bills—a practice that robs Peter to save Paul, as worker productivity can end up dropping.

The researchers subjected the data from nine earlier studies to statistical analysis to compare the results across studies. Five studies collected data from call

ing parameter was further normalized by dividing by the difference between the two ventilation rates and multiplying by 10.

Results typically showed increases in average work performance in the range of 1–3% for each 10 L/s-per-person increase in outdoor ventilation rate. The performance increase was greater when ventilation rates were initially low (below 20 L/s per person, which is twice the ASHRAE standard) and almost negligible when ventilation rates were already high (above 45 L/s per person). The authors speculate that the improvement of performance was related to reducing levels of indoor air pollutants.

Will this analysis encourage those who design and manage office buildings to let more outside air flow to their occupants? Not in the short run, says Bayer. “Concerns are still primarily with energy conservation, and are increasing due to continually increasing energy costs.” But, she says, this new analysis provides those who are interested with a tool to better balance the needs of energy conservation and worker health and performance.

—John Manuel

New UNEP Leader Chosen

The UN General Assembly has unanimously selected Achim Steiner of Germany to succeed Klaus Töpfer as the fifth executive director of UNEP. Steiner is presently director-general of the World Conservation Union, the world's largest environmental network, and will begin his four-year UNEP term in June 2006. Of the selection, Töpfer said, “I am convinced that choosing Achim Steiner will prove to be a great decision, bringing youth, dynamism, intellect, and a deeply held commitment to environment and sustainable development issues.” Steiner has degrees from Oxford University and the University of London, and has also studied at the German Development Institute and Harvard Business School.



China Approves Environment Plan

China is currently home to 16 of the world's smoggiest cities, many of the country's waterways are severely contaminated, and piles of construction refuse are being dumped in rural areas. Acid rain, industrial pollution, nuclear risks, and declining biodiversity also pose grave problems. In February 2006 China's State Council approved a plan to combat the country's pervasive pollution. A state media statement said, “The move is aimed at protecting the long-term interests of the Chinese nation and leaving a good living and development space for our offspring.” The plan calls for regional governments to set environmental targets to be evaluated regularly, and for local officials to be assessed on their environmental performance, not just their success in promoting economic development. Poor environmental performance by officials will be punishable under the plan.

Safe Harbor for Fish Lovers

A number of recent public advisories have warned women of childbearing age to limit intake of swordfish, shark, tuna, and other fish with high levels of mercury, since studies show that brain development in young children is affected when their mothers consume such fish. Now northern Californian fish lovers who are concerned about mercury are in luck. Holiday Quality Foods markets and select Sam's Club stores in the region now stock Safe Harbor certified fresh fish, which uses a new technology to measure the fish's mercury content at the packaging plant in about one minute (conventional testing can take a week or more). Fish that register more than the median FDA level for that species are rejected. The certification is part of a test by the stores and Pacific Seafood Group, one of America's largest fish wholesalers, to see if consumers would buy more fresh fish if they knew it contained safe levels of mercury.



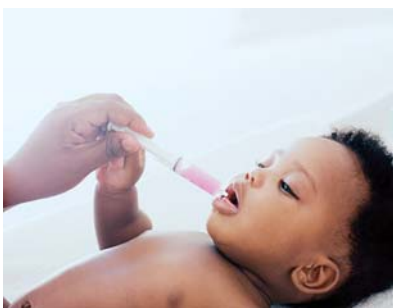
CHILDREN'S HEALTH

Do Antibiotics Now Mean Asthma Later?

Asthma affects 1 in 8 school-aged children in industrialized countries, making it the most common chronic illness in this group. Now a meta-analysis of child asthma studies led by pharmaceutical scientist Fawziah Marra of the University of British Columbia shows that children diagnosed with asthma were twice as likely as nonasthmatics to have received antibiotics before age 1. The more courses of antibiotics a child received in the first year of life, the higher the risk for asthma.

The meta-analysis, reported in the March 2006 issue of *Chest*, examined the link between antibiotic exposure in babies and subsequent development of asthma, as well as the dose-response relationship. Marra's team analyzed four prospective studies and four retrospective studies conducted between 1999 and 2004. Each study involved between 263 and 21,120 children, including cases who had been diagnosed with asthma between the ages of 1 and 18 years. The number of antibiotic courses taken ranged from one to seven, and averaged three.

Pooling the data from all eight studies revealed a twofold risk of developing asthma with at least one course of antibiotics. Each additional course raised asthma risk 1.16 times. Information about the



Unpleasant side effect. Antibiotic use before age 1 could contribute to childhood asthma.

antibiotics prescribed could not be obtained from the studies.

The findings support the "hygiene hypothesis," which proposes that an immune system that doesn't get enough practice killing germs (due to either an excessively clean environment or overuse of antibiotics) will become overly sensitized and overreact to normally harmless environmental agents such as pollen and dust.

Marra and her colleagues recently launched a community education campaign in British Columbia called "Do Bugs Need Drugs?" The program uses media ads, classroom visits, and educational materials to teach health professionals and the general public about the overuse of antibiotics. The campaign emphasizes the difference between bacterial and viral infections, useful preventive measures such as hand washing, and the need to use antibiotics wisely. "In children, antibiotics are commonly used to treat ear infections, upper respiratory tract infections, and bronchitis," says Marra, even though many such infections are viral and don't respond to antibiotics. Some parents may refuse to leave a doctor's office without a prescription.

The information gained from the meta-analysis is valuable for physicians who are striving to cut back on prescribing antibiotics, says W. Michael Alberts, president of the American College of Chest Physicians: "It can help to convince parents of young children to hold off on giving antibiotics unless absolutely necessary." —Carol Potera

POLICY

Live from Dubai: A New Chemical Agreement

After late-night, last-minute negotiations, a voluntary international agreement to protect humans and the environment against harmful chemicals was adopted on 6 February 2006. Representatives from 140 countries, environmental advocacy groups, industry associations, and UN agencies attended the three-day International Conference on Chemicals Management (ICCM) in Dubai, United Arab Emirates. The agreement establishes the Strategic Approach to International Chemicals Management (SAICM), which gives nations a framework for fulfilling the 2002 World Summit on Sustainable Development goal of ensuring that chemicals are produced and used in ways that minimize significant adverse effects.

Implementation of SAICM will be supported by a new chemicals secretariat within the UN Environment Programme that will carry out the "Overarching Policy Strategy." This strategy provides countries, especially economies in transition, with templates to begin coping with issues such as remediating contamination, using safer substitutes, and

creating toxic release inventories. The agreement offers broad suggestions such as reducing exposures by improving occupational safety, developing better responses to spills and accidents, and eliminating child labor involving chemicals. Some EU countries offered modest funding for a "Quick Start Programme" to help developing countries move ahead in the near term.

Many participants saw the meeting as polarized into EU and U.S. camps on some of the most contentious issues, including precaution—regulating or banning chemicals suspected of harm without complete certainty of their effects. In a February 7 statement on behalf of the EU presidency, Austrian minister Josef Pröll said, "We don't need to see a tragedy happen to put safety systems in place." The same day, U.S. assistant secretary of state Claudia McMurray told an AP reporter, "We have a different approach to the way we regulate chemicals in our country. We may not know everything now, but let's move forward anyhow."

The agreement incorporates wording from the 1992 Rio Declaration on Environment and Development stating that precaution "shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective

measures to prevent environmental degradation." The EU pushed to elaborate on this statement with a clearer connection between chemicals and human health—a push the U.S. delegation opposed.

Disagreement also arose over whether the agreement should invoke specific international bodies such as the World Bank or the Global Environment Facility as potential funding sources. The United States failed to win language that would have made SAICM irrelevant to multinational regulations such as those of the World Trade Organization, a position some say was aimed at keeping environmental and human health values from challenging trade practices.

In a February 27 press release McMurray said, "SAICM recognizes that while we all share the goal of minimizing the risks presented by some chemicals, there are many valid ways to achieve that goal." But others saw the meeting as lacking political will. Daryl Ditz, senior policy adviser for chemicals at the Washington, DC-based NGO Center for International Environmental Law, says, "Regrettably, the United States was the number-one obstacle to a coordinated global response to the problems posed by chemicals."

The ICCM next revisits the Dubai agreement in 2009 to assess progress and identify problems. —Valerie J. Brown

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The World of Food Science

The International Union of Food Science and Technology (IUFOST) is a nonprofit network of national food science organizations and is the only global food science and technology group, while the Institute of Food Technologists (IFT) is a U.S. scientific society for food scientists, technologists, and related professionals in industry, academia, and government. These two groups have come together to produce an online magazine, *The World of Food Science*, located at <http://www.worldfoodscience.org/>. With *The World of Food Science*, the IUFOST and the IFT work together to promote the scientific and technical aspects of international food production, distribution, preparation, and marketing, as well as provide current information to all food science professionals and others involved in the industry.

The World of Food Science



The homepage for *The World of Food Science* provides in-depth Focus and Feature articles collected from a variety of sources, including IUFOST correspondents and food scientists from around the world. Recent articles have covered modern biotechnology in food production, obesity, and how food packaging has evolved to ensure the safety of the food supply. Select articles are available in French and/or Spanish as well as English. Past articles are available by clicking the Archive link at the top of the homepage. The site also includes two Spanish-language sections: the full text of a report titled *Biología y Alimentos* ["Biotechnology and Food"] and IFT Scientific Status Summaries that have been translated from English to Spanish.

At the bottom of the homepage are links to documents and expert reports published by the IFT. Currently featured are annual buyer's guides for nutraceuticals (foods or food components that provide a medical or health benefit) and food industry services. Visitors will also find links to the expert panel reports *Functional Foods: Opportunities and Challenges* ("functional foods" are formulated with ingredients believed to impart health benefits) and *Emerging Microbiological Food Safety Issues: Implications for Control in the 21st Century*. Clicking on the links for the expert reports takes visitors to webpages devoted solely to those respective topics. Available resources include the full text of each expert panel review, one-page topic summaries, related news releases, and lists of frequently asked questions.

The homepage also includes a frequently updated collection of news coverage. Clicking on any headline takes the visitor to the Daily News page. A searchable library of past news articles is archived by month. Visitors can also choose from a menu of other news options: national food technology association news, regional reports on food issues, papers directed toward students in the field, international regulatory updates, and policy papers. The Events section has information on upcoming meetings related to food science and technology. —Erin E. Dooley

America's Best Development Projects

As part of its efforts to curb the expansion of low-density, vehicle-dependent communities, the Sierra Club has released its first *Guide to America's Best Development Projects*. The guide spotlights 12 U.S. projects that the group holds up as models for building healthier and more sustainable communities—and invites local governments to demand more of them. The featured projects boast access to a range of transportation choices, redevelopment of existing urban areas, proximity of homes to shops and offices, preservation of existing community assets such as older buildings and natural resources, minimization of stormwater pollution and runoff, input from the local citizenry in planning, and use of green building methods.



Building Eco-Cities in China

The London-based consulting firm Arup has signed a multibillion-dollar contract with Chinese officials to design and build up to five self-sustaining "eco-cities" around China. The first eco-city, Dongtan, on an island near Shanghai, is expected to be home to about 1.15 million people by 2040. The city's first phase, accommodating 50,000 residents, will be completed in time for the 2010 Shanghai Expo trade fair. Other locations have not yet been revealed. The cities, a magnet for investment funds, will feature the capture and purification of rainwater to support city life, use of organic waste materials as an energy source, and reduction of environmentally unfriendly landfills. Arup has also partnered with emissions brokerage CO2e to offset the carbon generated by personnel working on the initiative.

Maine Mandates e-Recycling

In January 2006, Maine became the first state to require that TV and computer monitor makers pay for the cost of recycling their products once they are discarded by consumers. The state has approved five waste services to gather and sort the electronic waste, ship it to recyclers, and bill manufacturers according to the amount of waste they originated. Municipalities may choose whether they will operate an ongoing collection center, do regular one-day collections, or have their residents deliver items directly to a nearby consolidator.



The law reflects similar initiatives in Europe and Japan to help keep toxic materials such as lead, mercury, cadmium, brominated flame retardants, and phosphorus coatings out of the environment. According to the EPA, e-waste is now the nation's fastest-growing category of solid waste.